| Program: **Diploma** Class: **UG** | Year: **Second** | Semester: **IV** |
|---|---|---|
| Subject: **Mathematics** | | |
| Course Code: **MN-2B** | Course Title: **Discrete Mathematics-II** | |

**Course Learning Outcomes:** This course will enable the students to:

a) Understand and explain the basic concepts of graph theory.
b) Apply the basic concepts of mathematical logic.
c) Analyze the basic concepts of mathematical logic.
d) Evaluate some real time problems using concepts of graph theory.

| Credit: **4 (Theory)** | **Compulsory** |
|---|---|
| Full Marks: **75** | Time: **3 Hours** |

| Unit | Content | Hours |
|---|---|---|
| I | **Logic:** Boolean algebra, Boolean expression, application to switching circuits. | 15 |
| II | **Graph Theory:** Basic Terminology, Walks, paths, circuits, connectedness, Handshaking Lemma, Isomorphism, Sub graphs, Reach ability, Union and Interaction of Graphs. Euler Graph, Shortest path problem, Hamiltonian graph, Traveling Salesman Problem, Bipartite graphs. | 15 |
| III | **Trees:** Introduction to trees, Rooted trees, path length in rooted trees, spanning trees, Fundamental circuits, spanning trees of a weighted graph, cut sets and cut vertices, Fundamental cut set, Minimum spanning tree. | 15 |
| IV | **Directed Graph:** Directed graphs and connectedness, directed trees, Matrix representation of a graph, Planar graphs: Combinational and Geometric Duals, Kuratowski's graphs, Detection of planarity, 5 colour problem. | 15 |

**Sessional Internal Assessment (SIA) Full Marks 25 Marks**
**A Internal written Examination 20 Marks (1 Hr)**
**B Over All Performance including Regularity 05 Marks**

**Books Recommended:**

1. C.L. Liu, Elements of Discrete Mathematics, Tata McGraw Hill, 2nd Edition, 2000.
2. N. Deo, Graph Theory with Applications to Engineering and Computer Science, PHI publication, 3rd edition, 2009
3. Harikishan, Shivraj Pundir and Sandeep Kumar, Discrete Mathematics, Pragati Publication, 7th Edition, 2010.
4. Colmun, Busby and Ross, Discrete Mathematical Structure, PHI Publication, 6th Edition, 2009